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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/806,609

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Mark A. Stettler

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10/28/2005

Michael A. Bernadicou
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Seventh Floor
12400 Wilshire Boulevard
Los Angeles, CA 90025

EXAMINER

LEE, CALVIN

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 10/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/806,609

Applicant(s)

STETTLER et al.

Examiner

Lee, Calvin

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 14-16 and 18-25 is/are rejected.
- 7) ☒ Claim(s) 17 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____ |

OFFICE ACTION

Claim Rejections - 35 USC § 102 or 103

1. The following are quotations of 35 U.S.C. 102(b) and 103(a) which form the basis for all obviousness rejections set forth in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 14-16 and 18-25 are rejected under 35 U.S.C. 102 (b) as anticipated by *Voldman* (US 5,923,067) or, in the alternative, under 35 U.S.C. 103(a) as obvious over *Dennen* (US 5,814,869).

a) In re claim 14, *Voldman* discloses a silicon-on-insulator structure comprised of:

- a body layer **44** comprising a channel region **88** positioned between S/D regions **86** [Fig. 5];
- a highly-doped substrate layer **40** doped to a P-type polarity [col. 6];
- an insulator layer **42** between the body layer and the highly-doped substrate layer; wherein the highly-doped substrate layer comprises two regions **152(b)**, **152(a)** adjacent the insulator layer **40** and aligned with the source and drain regions **86** [Fig. 10a and cols. 7-8], and a center region between the two regions **152(b)**, **152(a)** and aligned with the channel region **88**.

Since *Voldman* discloses the two regions **152(b)**, **152(a)** that are adjacent the insulator layer and are doped with dopants of a second polarity (i.e., N-type) opposite the first polarity of the substrate, *Voldman* teaches or suggests that the two regions are inherently the compensated regions with respect to the substrate. Nevertheless, such compensated regions are known in the semiconductor processing art as evidenced by *Dennen* disclosing a Fermi-threshold FET having a deeper contoured-tub **22'** to create a lowered capacitance for the source **23** and drain **24** of the FET [Fig. 16, 17D and col. 18], wherein the contoured-tub consists an uncompensated region located at the center of the tub and two compensated regions located at the two sides.

It would have been obvious to one having ordinary skills in the art to have modified the SOI structure of *Voldman* by utilizing compensated regions (i.e., the two end regions) formed inside a semiconductor substrate for the purpose of compensating for the junction with the substrate [Abstract].

- b) In re claim 15, *Voldman* suggests the S/D regions **86** doped to the N-type polarity [Fig. 5].
- c) In re claim 16, *Voldman* suggests the channel region **88** doped to the P-type polarity.
- d) In re claims 18-19, since *Voldman* suggests a gate **158** to substantially shield the channel region from implantation of dopants of a second polarity into the two regions **152(b)**, **152(a)** [Fig. 10a], *Voldman* inherently discloses that the channel region is shielded from implanting dopant ions by masking structure **158**.
- e) In re claim 20, *Voldman* suggests the second polarity is an N-type polarity and the first polarity is a P-type polarity, forming a NMOS structure [col. 6, ln.3].
- f) In re claim 21, *Voldman* suggests the second polarity is a P-type polarity and the first polarity is an N-type polarity, forming a PMOS structure [col. 9, ln.64].

g) In re claim 22, *Voldman* suggests the thin substrate layer and highly-doped substrate layer 40 comprising silicon, and wherein the insulator layer 42 comprises silicon dioxide [col. 5, ln.23].

h) In re claims 23-25, *Voldman* in view of *Vinal* (or in view of *Dennen*) teaches the claimed invention as applied to claim 14, except for the teaching of the dopant concentrations for the uncompensated regions, the channel region, the S/D regions, and the compensated regions (regarding claim 23); wherein the first dopant atoms are boron atoms, and the second dopant atoms are selected from the group consisting of arsenic and phosphorus atoms (regarding claim 24); and wherein the second dopant atoms are boron atoms, and the first dopant atoms are selected from the group consisting of arsenic and phosphorus atoms (regarding claim 25).

The selection of above mentioned parameters such as energy, concentration, temperature, time, molar fraction, depth, thickness, etc., would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. Normally, it is to be expected that a change in energy, concentration, temperature, time, molar fraction, depth, thickness, etc., or in combination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality ... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller* 105 USPQ233. 255 (CCPA 1955).

Allowable Subject Matter

3. Claim 17 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim because *Voldman* is silent about “the compensated regions are doped with dopants of a second polarity to a concentration substantially equivalent to the concentration of the first doping polarity of the uncompensated region.”

Contact Information

4. Any inquiry concerning this communication from the Examiner should be directed to *Calvin Lee* at (571) 272-1896 from 7:00AM to 5:00PM (Monday-Thursday, Eastern Time). If attempts to reach the examiner by telephone are unsuccessful, Art Unit 2825's Supervisory Patent Examiner *David C. Nelms* can be reached at (571) 272-1787.

Any inquiry relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0596. The central fax number is (571) 273-8300 for all communications to be entered (e.g., amendments, remarks, IDS, etc.)



Calvin Lee

Dated: October 25, 2005